

wherein the oxygen-smelting produces a slag, in which a weight ratio of CaO to (SiO<sub>2</sub> + CaO) is greater than 0.6 to 0.85 and a weight ratio of Fe to (FeO<sub>x</sub> + SiO<sub>2</sub> + CaO) is greater than 0.5 to 0.6, and at least one of white metal, nearly white metal matte, and blister copper by adding SiO<sub>2</sub> material and CaO material to the copper sulfide concentrate as flux.

2. A method of smelting copper sulfide concentrate according to Claim 1, further comprising:

slowly cooling the slag until at least a portion of the slag is solidified;

subjecting the slag to pulverization and flotation to produce recovered copper;

and

subjecting the recovered copper to the oxygen smelting process.

5. A method of smelting copper sulfide concentrate, comprising:  
oxygen-smelting the copper sulfide concentrate using a concentrate burner located above a melt;

removing part of Fe in the copper sulfide concentrate to a first slag and part of S in the copper sulfide concentrate to SO<sub>2</sub> to produce a matte comprising FeS and Cu<sub>2</sub>S;

adding SiO<sub>2</sub> material and CaO material to the matte; and

oxygen-smelting the matte to remove Fe as a second slag and to remove S as SO<sub>2</sub>, thereby obtaining blister copper;

wherein the second slag has a weight ratio of CaO to (SiO<sub>2</sub> + CaO) of greater than 0.6 to 0.85 and a weight ratio of Fe to (FeO<sub>x</sub> + SiO<sub>2</sub> + CaO) of greater than 0.5 to 0.6.

6. A method for smelting copper sulfide concentrate according to Claim 5, further comprising:

slowly cooling at least one of the first and second slags for solidification;

subjecting the at least one of the first and second slags to pulverization and flotation to produce recovered copper; and

subjecting the recovered copper to the matte oxygen smelting process.

7. A method of smelting copper sulfide concentrate according to Claim 5, wherein at least one of the first and second slags is maintained in a molten condition and again subjected to the matte oxygen-smelting process.

8. A method of smelting copper sulfide concentrate according to Claim 5, wherein at least one of the first and second slags is cooled and solidified and then again subjected to the matte oxygen-smelting process.

9. A method of smelting copper sulfide concentrate according to Claim 5, wherein the  $\text{SiO}_2$  content in the matte is at least 1.7% by weight with respect to the Fe to be removed in the second slag.

10. A method of smelting copper sulfide concentrate according to Claim 5, wherein the temperature of the second slag is maintained up to 1280°C.

2  
FINNEGAN  
HENDERSON  
FARABOW  
GARRETT &  
DUNNER LLP

1300 I Street, NW  
Washington, DC 20005  
202.408.4000  
Fax 202.408.4400  
www.finnegan.com